



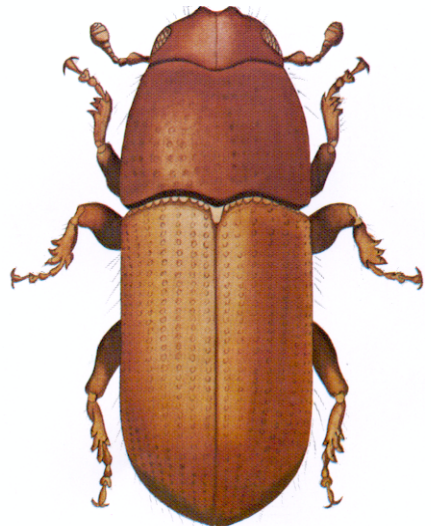
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## Southern Pine Beetle Handbook

# Southern Pine Beetles Can Kill Your Ornamental Pine



In 1974 the U.S. Department of Agriculture initiated the Combined Forest Pest Research and Development Program, an inter-agency effort that concentrated on the Douglas-fir tussock moth in the West, on the southern pine beetle in the South, and on the gypsy moth in the Northeast. The work reported in this publication was funded in whole or in part by the program. This manual is one in a series on the southern pine beetle.



# Southern Pine Beetles Can Kill Your Ornamental Pine

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Pine Bark **Beetles** —  
A **Forest** Menace



Figure 1.—Red-topped trees killed by beetles.

Southern pine beetles are compulsive eaters. Each year in the South from Texas to Virginia the voracious insects conduct a movable feast **across** thousands of **acres** of pine forests. Most trees die **soon** after the beetles sink their teeth into **them** (fig. 1).

And hungry beetles are hard to stop. In the early **1970's**, they killed pines containing enough board feet of lumber to build about **55,000** new houses. **Las** than half of **this wood was re-** moved from the forest and used.

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## And They Can Be a Menace To You, Too

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Unless you are a forest manager or work in the woods, you may not know just how much damage the beetles can do. Normally, they remain under the bark of pine trees back in the forest, silently gnawing away at a healthy chunk of the southern timber supply.

But not always. Sometimes they forage across forest lines and onto suburban or urban lots and yards (fig. 2). The homeowner with pines is not out of the woods as far as southern pine beetles are concerned. For this reason, owners of ornamental pines in the South should learn how to recognize and cope with bark beetle attacks.

Figure 2.-Newly killed pines around suburban home.

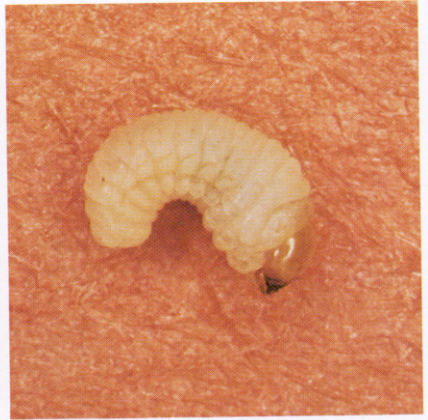


## Appearance and Life Cycle

3A



B



C



D



Adult southern pine beetles **are** roughly  $\frac{1}{8}$  inch long, which is about the size of a **grain** of rice, and reddish brown to solid black. The insect goes through four life stages--egg, larva, pupa, and adult (**fig. 3**)--in the inner bark of its host pine tree.

Eggs **are** mere pearly white dots. Larvae, or "grubs," are white, legless, and **crescent** shaped, with glossy reddish-brown heads. Pupae **are** also white but closely resemble the adult beetle shape.

Beetles mature in about a month and three to eight generations **are born** each year. Adults have wings? after killing the tree in which they **were** born, the beetles fly to another **living** pine to start the life **cycle** again.

Figure 3.—Life stages of the southern pine beetle; A, egg; B, larva; C, pupa; D, adult.

Associated Beetles

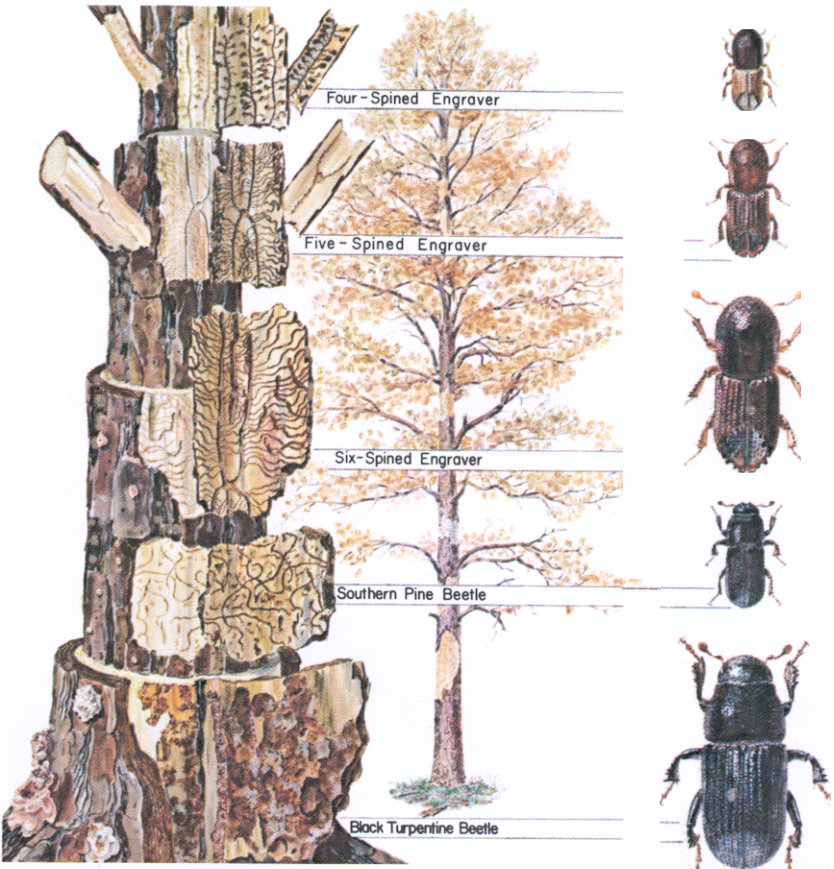


Figure 4.—Major pine bark beetles of the South and the trunk areas usually attacked. From top to bottom: small *Ips*, medium *Ips*, large *Ips*, southern pine beetle, and black turpentine beetle.

## How Beetles Kill Pines

Southern pine beetles may feast on a tree by themselves, or they may have company -three species of **Zps** engraver beetles and black turpentine beetles. The different species sometimes strike at the same time, making it hard to tell precisely what role each species plays in killing the pine and how much they help or hinder each other (fig. 4).

There are three sizes of **Zps** engraver beetles. The smallest is slightly smaller than the southern pine beetle and attacks the upper part of the pine, including high branches. Middle-sized **Zps** prefer the midsection and upper level of the trunk, while the large engravers seem to favor the lower ~~one~~ third. Although they can wipe out an entire stand of pines if conditions are conducive to beetle spread, all species of **Zps usually** kill only one or a few pines in isolated outbreaks.

The black turpentine beetle is the largest bark beetle in the South, about  $\frac{1}{4}$  inch long. Yet it is the least destructive because it attacks in smaller numbers, strikes fewer trees, and takes longer to kill them than the other species do. The black turpentine beetle likes the lower third of very weak or dying pines and will even make a home for itself in freshly cut stumps.

Southern pine beetles can kill a pine tree in a matter of days. Thousands of winged adults attack a single tree, bore through the bark, and hollow out egg "galleries." The females lay eggs in niches beside the galleries. In a week or so, larvae hatch and start chewing their way through the cambium-living conductive tissue-around the tree. This feeding "girdles" the pine and cuts off the normal flow of moisture and nutrients throughout the tree's system, quickly sapping its strength and contributing to its death. Adult feeding and a blue-stain fungus, which piggybacks its way inside pine bark on attacking adult beetles, help bring on tree death.



## Symptoms of Beetle Attack



Successful attacks by southern pine beetles or by more than one species of *Ips* engravers always kill the tree. But if you act quickly enough, your pines can weather attack? by black turpentine beetles. Because control measures depend in part on whether or not the tree can be saved, you must first identify the species of beetle you are dealing with.

First signs of southern pine beetle attacks are popcorn-size lumps of pitch, called "pitch tubes," which occur at heights up to 60 feet (fig. 5). The pitch tubes of black turpentine beetles are much larger—about the size of a fifty-cent piece—and appear at the foot of the tree (fig. 6). *Ips* beetles rarely leave pitch tubes. During dry weather, pitch tubes do not appear; instead, red boring dust, which looks like fine red sawdust, will collect in bark crevices and at the base of the pine.



In later stages of southern pine beetle attack, you will be able to see small S-shaped feeding cuts on the inside of the bark (fig. 7). Black turpentine beetles make vertical, wide etchings and *Ips* cut either Y- or H-shaped tunnels. The final sign of attack—and the sure mark of death for the tree—is a fade in needle color from green to yellow, red, and brown (fig. 8).

Figure 5.—Pitch tubes, the first sign of southern pine beetle attack.

Figure 6.—The pitch tubes of black turpentine beetles are larger and lower on the tree than those of southern pine and *Ips* beetles.



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Figure 7.—Beetles chew galleries in the inner bark of pines.

Figure 8.—Needles on trees killed by beetles fade from green to yellow, red, and brown.



**Pines Likely to be Attacked**

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11



Figure 9.—A healthy pine can sometimes pitch out beetle attacks.

Figure 10.—Beetles often attack lightning-struck pines.

Figure 11.—A pine that has been gouged by heavy equipment.

Figure 12.—Construction work has disturbed this soil and skinned bark from the trees.

Figure 13.—Laying sewer or water lines can disturb soil and weaken pines.

Some trees are apparently more appetizing to southern pine beetles than other trees. For instance, beetles seem to prefer loblolly, shortleaf, and Virginia pines to other kinds. During a beetle population explosion, however, the insects will take any species of pine available.

And old, unhealthy, or weakened pines of all species —whether diseased, damaged, or otherwise stressed —can be sitting ducks for southern pine beetles. Such trees have limited supplies of pitch, which is a tree's best natural defense against wood-boring insects. Healthy pines can sometimes "pitch out" beetle attacks by entrapping or smothering the invaders with a heavy and prolonged flow of pitch. Sick ones cannot (fig. 9).

What weakens pines? Natural causes like old age, drought, prolonged floods, hard freezes, tire, and lightning strikes can undermine your pine's vigor and make it more vulnerable to beetles (fig. 10). The same is true of diseases such as littleleaf and fungus-caused root rot.

Man, too, causes problems. Common landscaping operations like bulldozing and road grading may inadvertently pave the way for beetles by damaging tree roots and trunks (fig. 11). Heavy traffic by trucks and other construction equipment during the building of a new house often packs down the soil around tree roots. This hurts the pine because it prevents normal movement of water and air through the root zone (figs. 12 and 13)



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## What You Can Do to Prevent Beetle Attacks

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Figure 14.—This old, diseased tree jeopardizes the healthy ones next to it

The best way **to** protect your pine trees is to make sure they are not attacked in the **first** place. Keep them healthy. Remember, a wounded, sick, or lightning-struck pine on your lawn is a standing invitation to dinner for southern pine beetles.

But the beetles' preference for sick **or** weak trees does not mean they cannot or will not kill healthy pines. They often do. In fact, **once** the bugs have built up a large population, not even the strongest and healthiest pines can fight them off. This is why a single damaged or unhealthy pine in your neighborhood--which the beetles can use **as** a place to get **started**—**endangers** all the rest, sick **or** healthy (fig. 14).

If you are building a new house, keep the **soil** from **being** packed down or piled up on tree **roots**. This will help prevent drastic changes in ground water movement. Avoid leaving only old, large pines on your land, since these trees are prime targets for beetles. In **warm** weather during the construction period check **every** few days for pitch tubes on the outer bark of your trees.

On older, established lawns, you should water pines during dry spells and fertilize them as needed. As a general rule, two pounds of fertilize-such **as** 10-8-6 formula-for **each** inch of tree diameter will be





enough supplemental nutrition for mature pines. For younger trees of less than 6 inches in diameter, use only one pound of fertilizer per inch of diameter. For soil analysis and more complete details on fertilizing your pines, check with your county extension agent (fig. 15).

Figure 15.—Beetles may attack healthy pines on established lawns.

## **Insecticides-an Ounce of Prevention?**

What about insecticides? At present, two chemicals effective against all southern pine bark beetles are available, but this could change with new Environmental Protection Agency rulings. See your county agent about approved insecticides, amounts to use, and methods of application. Of course, be sure to read instructions carefully and to handle such compounds cautiously.

## **How to Control Beetle Spread**

But what if it is already too late for an ounce of prevention? By the time you spot the telltale symptoms of beetle attack-pitch tubes, feeding cuts in the inner bark, and fading of tree foliage-it is too late to save the tree. You have only one move left. Stop beetle spread.

You can do this in two ways. First, if the beetles are still under the bark of the dead or dying pine, cut it down and haul it away or burn it. This should break up the center of beetle emergence and stop them from infesting other trees.

Second, spray the attacked pine with an approved insecticide, which will kill eggs, larvae, pupae, and adults still under the bark. Or, you can spray uninfested trees adjacent to the one under attack to protect them during the period of beetle emergence. Whichever method of control you choose, you must act quickly or the beetles will spread to other pines.

## Acknowledgments

### A Check List for Coping with Beetles

- Avoid damage to pines during yard work and construction.
- Keep pines healthy by watering and fertilizing them.
- Watch for pitch tubes and boring dust, especially in summer and spring.
- Quickly remove infested trees or spray with an approved insecticide.

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